App. F. IX-4

Previous References

193/ .
(Medical)

File No. 13-

Serial Nos. 1-7

Later References

PRESERVED

General and Revenue Secretariat.

Serial Nos. 9.

Part B for August 31

SUBJECT.

Scheme for starting a Amine Factory in the Mysore state

141
1117

App. F. III—2]

General and Revenue Secretariat | Med File No. 13 of 1930

Serial No.	
1	Letter dt 4.6.1930 From Mr. B. L. Manjunath Forwards a note on the Erection of a Quinine Factory in Mysore State. Orders on P.U.P:- 1) "This is sent to me at my request. The proposals of the S.S. may be awaited", (Chief Secy with compts). Sd/- K.M. 5.7.30. 2) "For perusal. (First Member) Sd/- N.M. 7/7 Sd/- N.B. Sd/- M.N.R. 8/7/30. Sd/- N.M. 8/7 " - MB.
2)	No. C.417-1 dt 12.8.1930 From the Senior Surgeon. Submits his views on the question of the possibility of manufacturing medicinal drugs, specially quinine. 3) Submitted with references. The proposal is Sd/- MB 14/8/30. refer the matter to Dr. Coleman whose deputn to Java is for months. MB 1) A copy of the S.S's letter may perhaps be forwarded to Dr. Coleman for a report on his return from Japan. taken. Chief Secy) 16/8

OFFICE OF THE THIRD MEMBER OF COUNCIL 18 AUG. 1930 No. 1788

OFFICE OF THE FIRST MEMBER OF COUNCIL 25 AUG. 1930 1291

OFFICE OF THE SECOND MEMBER OF COUNCIL 21 AUG. 1930 1615

Note—Contn. Sheet

Second Member ✗ 18/8
Second Member ✗
First Member ✓ 19/8

(2328)—GPB—10,000—22-4-30

(352)

1117/1895

App. F. III—2]

General and Revenue Secretariat

File No. 13 of 193 .

Serial No.

will issue under Chief Secy's signature.
28/8

1) Draft is submitted for approval.
28/8
Chief Secy)
28/8

2) Issue. Please submit to Dev Secy for use afterwards
28/8

RECEIVED 1930

3 To Director of Agriculture
no. G.2517 of 28.8.30.
Forwards a copy of the S.S.'s letter (M.2) for a report after his return from deputation to Java.

9) Resubmitted.
28/8
Dev. Secy) 10) Issue
1/9.30

4 From The Dir. of Agriculture in Mysore
Letter no. R.O.C. 512-Se.109/30-31 9.9.
States that he will carry out the instructions of Govt. in the matter of investigations about the question of Cinchona production with a view to manufacture Quinine locally
11) Sealed. with reference to para. 4 supra.
M. 12) His report may be awaited.
12.9.30.
dd
11/9

SUS A
M.
13.9.30.
13 SEP

5 From The Dir. of Agri. in Mysore
Letter no. R.O.C. 512-Se. 109/30-31 dt 11.9.30
Submits a report as called for re: the manufacture of Quinine locally.

Note—Contn. Sheet

WD 02328---GPB---10,000---22-4-30

Serial No.

(3) Subd. The Note referred to by the dir. of agric. will be awaited. Meanwhile a copy of the letter may perhaps be sent to the S. S. for information.

(4) Subd. with a draft

PK 16/12/30

(5) Done

Chy 16/12

6 Senior Surgeon — 6

G. 6467, 19.12.30.

Forwards copy of S 5 for information and notes that the note referred to therein will be sent as soon as it is received.

From the dir. of agriculture letter no. R.D.C. 512-e. 27/3-30 of 17.12.30 forwards his report on Cinchona Cultivation in Java

(6) Subd. with a draft

PK 27.12.30

(7) For perusal before issue

Ch Secy. 30/12/30

CHIEF SECRETARY 30 DEC. 1930

(8) The report may be acknowledged with an expression of the appreciation of Govt of the trouble taken by Dr Coleman in collecting such information as it was possible to

Note–Contn. Sheet

(683) 1934

App. F. III—2]

General and Revenue Secretariat Mre File No. 13 of 1930.

Serial No.

SECRETARY'S OFFICE
3048
6 JAN 1931

obtain regarding cinchona cultivation in Java.

19) Dr Coleman may also be informed that Govt approve of his proposal to invite Dr Herbold to Bangalore. The Senior Surgeon and Dr Coleman may meet this gentleman and ascertain further particulars about the proposed supply of genuine at prices considerably lower than those of Madras genuine.

by the Madras Bureau

20) With regard to the idea of manufacturing genuine locally from imported bark, the first thing of course is to make sure that supplies of bark will be forthcoming. Before approaching Mr Howards as suggested in this matter it would be expedient to consult the Govt of India as the import & cultivation of cinchona are strictly controlled by them and any attempt to negotiate with Mr Howards without their knowledge might be misunderstood.

OFFICE OF THE SECRETARY OF COUNCIL
7 JAN. 1931
No. 5964

21) Experiments are said to be under way, with the germination of the seed obtained from Java. The results of these experiments may be awaited.

22) Copies of the report of Dr Coleman may be sent to the Senior Surgeon & the Chief Conservator.

Mem
24/2/31

Members of Council.

OFFICE OF THE THIRD SECRETARY OF COUNCIL
9 JAN. 1931
3285

NOTE – Contn. Sheet

W.D 02553—50,000—GPB—8-7 31

Mem 9/1/31 KG 7-1-31 6-1-31 6/1/31

Med File No. 13 of 1930.

General and Revenue Secretariat

23) Sealed with 3 drafts

24) Please put up typed drafts of I & II

10.1.31

18/1

25) Sealed with typed drafts as required above

13.1.31

26) The S.P.C. has in another file applied for the purchase of Cinchona from the Nilgiris Bureau.

13/1

27) Draft I is for consideration. It seems suffi: if a copy of it together with a copy of the Report is sent to the other officers named.

28) Action on parag. 20 will perhaps have to be taken after discussion with Dr. Berbosch. But attention is, however, invited to the discussions in Ft. 189-26 to 9 in the course of which, it was stated that the Govt. of India cannot control the import & cultivation of Cinchona in Mysore.

Chief Secy)

19/1

The control applies of course to British India and includes cultivation of cinchona as well as purchase of bark from Java (through Messrs Howards)

19 JAN. 1931 CHIEF SECRETARY.

29) Issue

21/1

30) The letter to the Director may go today

31) Letter issued as directed above

21.1.31

Imer Letter no. 976 46 dy 21.1.31 to the Director of Agriculture in Mysore.

Memo. to (1) S.S. (2) Ch. Com. of Forests & Ex. Sec. nos. 5043-5 dy 29.1.31.

The copy of the letter has been received by the Govt Agriculture Chemist

31/1/31

Serial No.

32) Sus list for April 31.

"This file may perhaps be closed. Put up".

SD. MM 13/8-

Med 16/8-

Med file 13 of 30 put up as per ~~For orders.~~ orders.

MM 4/6

33) In view of the Chief Secy's order dt 6.4.31, Reminder will issue about the end of July next.

MM 5/6

Gesdt 5/6

9

From the Director of Agriculture Letter No R.O.C 433 of 31-32 dated 13.8.1931 States that Dr Kerbasch was unable to visit India on his way back to Java, and that it is unlikely that he will be able to visit Mysore for another 2 or 3 years.

34) Submd with the previous papers. Kind reference is invited to the Letter issued to the Dir of Agriculture on 21.1.1931.

MM 17.8.1931

(In the circumstances stated in the case, it is for orders, if the file may for the time being, be closed).

DS 17/8/31

Genl: Secy)

I Member)

20/8

by arrgts HM

B 21.8.1931

L

GENERAL SECRETARY'S OFFICE OF THE COUNCIL 17 AUG. 1931 No. 1332

OFFICE OF THE COUNCIL 20 AUG. 1931 No. 1947

NOTE—Contra Sheet.

WD 02553—G P B—50,000—8 7 30

med 13-30-1

CENTRAL COLLEGE, BANGALORE.

DEPARTMENT OF CHEMISTRY

4th June 30.

Dear Sir,

1) I enclose herewith a copy of the note on the erection of a Quinine Factory in Mysore State submitted by me to the Senior Surgeon.

Yours sincerely,

B. L. Manjunath

Rajamantrapravina

K. Matthan Esq., B. A.

Member of the Executive Council.

2) This is sent to me at my request. My proposals have been awarded S. S. marks

5.7.30

3) For perusal

7/7/30

8/7/30

A note on the erection of a Quinine Factory

in the Mysore State.

Part I

General Considerations.

Bark requirements. The Quinine (as sulphate) consumed in the State annually may be estimated at 4000 lbs. The proposed factory should be able to turn out this quantity in a year. Since the average content (as sulphate) of the Indian bark is about 3%, the quantity of raw material required will be 1,40,000 lbs., if we work on the basis of a 3% yield.

Bark supply. At present there is no land in Mysore under Cinchona cultivation. There might be a few trees in some the coffee plantations in Malnad. The yield of bark from them might be worth consideration in view of the large requirements of the factory. Thus we will have to depend, almost entirely, for the principal raw material, on the market outside - in India and in Java.

Indian bark. The following facts may be noted in connection with the bark available in India. Although there was a sort of Cinchona boom in the early part of this century in India and Ceylon, a very marked decline started as a result of a rapid fall in the price of the bark. Many of the private planters who had started extensive schemes of plantations gave them up for tea, coffee and rubber which had the advantage of yielding quicker returns. They began rapidly clearing the land under Cinchona to make room for other commercial crops. As a result, it is safe to say that within the next ten years there will be practically no private owned Cinchona plantations. There are, however, large plantations owned by the Government of India in Darjeeling, on the Nilgiris and fresh and extensive acerage is being opened up on the Anna-

Annamalai Hills. But the quantity of bark harvested meets roughly only half the requirements of their two factories. Consequently it is futile to expect them to allow any of their bark to be worked in the Mysore factory. The situation therefore is roughly this : The Government of Mysore will have to compete with the Government of India for the purchase of the bark in private hands in India. It might again be repeated that that this source of bark will be exhausted in another ten years if not earlier.

Bark from Java.

Again there are some serious difficulties in the way of importing bark from Java. The Dutch, who are producing more than 90% of the world's supply of Cinchona bark and who have several factories in Java producing Quinine. The Quinine factories in England and Germany have an agreement with the producers of Java as the price of Quinine is determined by the conditions of the Amsterdam bourse. Again it might be noted that although the Government of India purchase a good quantity of barks from Java annually, they pay the price for the Quinine content of the bark as sulphate, less the actual working charges. Thus it is doubtful if importing the bark from Java is an economic proposition, particularly because we will have to reckon for transport charges up to the factory, the customs duty and other items.

Opening of plantations.

Thus, as a preliminary to the starting of a factory it would be advisable to open up Cinchona plantations in suitable areas in the State. I believe there is a fairly large area in Mysore pre-eminently suited for the cultivation of Cinchona, particularly in the Malnad districts and it would be best to begin with an experimental plantation, as the raising of Cinchona is by no means an easy work and if it proves a failure, the results, which can only be ascertained after the lapse of about ten years, may prove to be financially disas-

Interests of the Government of India.

Again it is best to take stock of the interests of the Government of India before embarking on a scheme for the production of Quinine in Mysore. They have at present two large factories in India, one in the Nilgiris producing annually about 22,000 lbs. of Quinine and the other at Darjeeling with nearly double the output. It has already been mentioned that the bark harvested in the Government plantations is hardly enough to meet half their requirements, and in addition to purchasing practically the whole of the locally grown private bark they are importing a considerable quantity of bark from Java in order to maintain the optimum output from their factories. The function of the Indian factories has been more or less to act as a check against undue flyctuations in the price of Quinine, by maintaining in the hands of the Government of India a constant stock of Quinine estimated at more than a crore of rupees worth. Again, as a result of the bitter experience gained during the war owing to the Dutch monopoly, they have started on extensive plantations on the Annamalai Hills with the definite object of meeting the all-India demand and at the same time establishing the Quinine independance of the British Empire in the event of future disturbances of economic and political equilibrium. Thus although the factory and plantations in Mysore may fall in line with the intentions of the Government of India, a certain competition is bound to spring up at least in the initial stages. This factor however can be adjusted by mutual accomodations.

Synthetic anti-malarials.

The problem of Quinine production is further complicated by the fact that a systematic research is being undertaken to produce synthetic anti-malarial drugs, which has already resulted in the evolution of one important compound Plasmochin. It is fairly certain that in the near future a product will be discovered which will be at least as efficacious as Quinine in the

treatment of Malaria - a result which will ahve an effect on the Cinchon, industry similar to the one which befell our indigo plantations during earlier part of the last decade when the synthetic dyestuff became a commercial proposition.

Proposals. Thus it will be seen that the starting of a Quin -ne factory in Mysore presents several serious problems. The first step in that direction, however, should be the opening of suitable Cinchona plantations, which can maintain a steady supply of bark to the proposed factory. If the factory is also to be started simultaneously, it would be better to leave it in the hands of private enterprise well subsidised by the State in order to overcome certain obvious difficulties.

The problem would become much easier if the immediate objective of the factory is made the production of Cinchona febrifuge. There are at present one or two small and successful factories in Bengal producing Cinchona products from whatever bark they can get hold off. The initial outlay and the working expenses of such a factory would be considerably lower and well within the means of a small limited liability concern. The fairly high price of Cinchona febrifuge (8 to 10 Rs./- per lb.) ensures a good margin of profit.

The value of Cinchona febrifuge is undisputed. It is regarded as a valuable substitute for Quinine, and is said to be even more efficacious than Quinine itself in the treatment of certain types of Malaria. The Indian bark is rich in alkaloids other than Quinine and Quinidene and the principal constituent Cinchonidene is said to have 60% the therapeutic value of Quinine. This bark would lend itself very readily to the manufacture of febrifuge.

Further the hardiest variety of Cinchona is Cinchona succirabra which has a low Quinine content and is rich in total alkaloids whereas the species that have a high Quinine content require very special conditions for the growth and development, this variety thrives even under very difficult conditions and consequently it would be possible to open up rapidly a sufficient acerage to meet the demands of the factory, thus making it virtually independant of bark grown outside Mysore.

When a concern is established on the above lines the production of Quinine also may be undertaken on a small scale if suitable opportunities offer themselves and depending upon the development of Cinchona plantations, the factory may gradually be equipped for turning out Quinine.

Proposal for committee.

Before embarking on any scheme involving the manufacture of Cinchona products I suggest that an expert committee be formed to go into the whole question in detail and I shall very glad to place my services at the disposal of such a committee.

Part II

Details regarding the factory.

Location.

The factory should be situated inma place within easy reach of the proposed plantations. There must be a plentiful supply of fre: water throughout the year. Nearness to cheap fuel is another impor:an: consideration. Regarding the actual site it would be advantageous t: have it erected on a slope so that the successive operations can be carried out on different floors one below the other. I believe that these considerations can be met with if the factory is located near Bhadravati Iron Works. Technical and engineering help and workshop fa lities will also be within easy reach.

Factors conditioning the size of the factory.

Annual production of Quinine sulphate B.P.	4,000oz.
Quinine sulphate in bark form to be put into the works (95% yield)	4,2[illegible]lbs.
Bark that should be put into the works (3% Quinine sulphate content : the average for Indian bark)	1,40[illegible]lbs.
Number of working days in a year.	
Bark that should be worked per day.	

In preparing an estimate for a factory due allowance should be made for future developments.

Labour, Supervision, Direction and administration.

(Recurring expenditure)

Labour. on the basis of daily wages.

Unskilled	:	4 men and 3 women
skilled	:	6 men
Watchman	:	1 man.

Supervision. Foreman (with a certificate of proficiency in mechanical engineering from the Engineering School) Rs.[illegible]

Overseer (must have a certificate in mechanical engineering and in Chemical engineering, preferably from the Victoria Jubilee Technical Institute of Bombay. Also he must be a qualified engine driver.) Rs.80-10-150.

Direction and administration.

Storekeeper and clerk : (with a certificate in book-keeping, shorthand and typing.) Rs.30 - 5 - [illegible]

Chemist : (a fully qualified B.Sc. in Chemistry. Must have had further training in organic analysis and Chemical engineering.) Rs.100 - 10 - [illegible]

The functions of the staff are fairly clearly indicated by the qualifications they are required to possess. With the assistance of the foreman, the overseer will supervise all the mechanical and chemical operations in the factory. As soon as the routine work commences, the chemist must assure full responsibility both for the discipline and efficiency of th e factory.

Building requirements. (Capital expenditure)

1. Bark stores and general stores	40' -20' - 15'. 20' -20' - 15'.
. Disintegrator and mixing shed	30' - 20' - 20'.
. Main factory building	40' - 40' - 30'.
. Purification section	40' - 20' - 30'.
Dyeing chamber	20' - 20' - 15'.
Laboratory and office	30' - 20' - 15'.

The dimensions of the various sections given above are to be taken only as a rough guide. There are several factors which will influence the actual construction of the factory, and details can only be prepared when the location is fixed upon.

Certain general remarks may however be made. The bark store should be of solid construction and damp-proof and the disintegrator and mixing sheds may be placed immediately next. Sections 3 and 4 will constitute the main factory building and it is advantageous tom lay them out on an incline in order to reduce transport charges and outlay on mechanical contrivances. The drying chamber may with advantage be placed next to the boiler room. The laboratory and office form an independant unit. The former will have to be suitably equipped for analytical work.

Factory operations and the requisite plant and machinery.

(Capital expenditure)

Pre-extraction.

1. Grinding the bark.
   - a. 1 disintegrator of size 2 1/2 with sifting arrangement.
   - b. 25 H.P. engine.
2. Mixing.
   - a. a mechanical mixer capable of mixing 50 lbs of material in 10 minutes.

Extraction.

3. Oil-extraction.
   - a. Oil storage tank capacity 2,000 gallons
   - b. (2) steam jacketed digestor with stirring arrangement cap. 700 gallons
   - c. 3 steam coil lined oil containers cap. 500 gallons.
   - d. Centrifugal pump for oil connection
   - e. A boiler
   - f. 25 H.P. engine
   - g. A concrete tank of 5,000 gallons capacity for oil recovery.

4. Acid extraction.

a. A lead lined trough 5' x 6' x 4' fitted with a perforated lead tube at the bottom.

b. An air pump.

c. Filter press (acid proof) to deal with 500 gallons in 6 hours.

d. An open lead lined tank cap.500 gallons

5. Nuetralisation.

a. Cast iron enamelled pan cap. 40

b. 3 cooling troughs of concrete, cap. 500 gallons.

c. 1 acid proof montejus, cap. 30 gallons.

6. Separation of "the crude".

a. 2 centrifuges (diameter of basket 2')

b. 3 cast iron tanks, cap.1,000 gallons.

Purification and despatch.

7. Purification.

a. 3 open concrete troughs, cap.2,000 gall.

b. 2 boiling pans with steam inlet cap. 60 gallons.

c. 2 sets of filtering arrangements.

8. Drying.

a. Hot air blower worked by 2 H.P. engine

b. Racks with trays.

Manufacture of other Quinine products.

a. Bisulphate.

b. Hydrochloride — 2 enamelled crystallising pans cap. 200 gallons.

c. Bihydrochloride — vacuum evaporating pan, cap. 15 gallons. Small vacuum pump.

d. Tablets. — A rotary tablet making machine.

The purpose of this note has been merely one of indicating the nature of the principle items of plant and machinery required for the factory. No attempt has been made to give any detailed mention of

the requirements. This can only be done when the scheme is actually taken on hand.

The approximate cost under this heading may be put as Rs. 50,000. To this must be added another Rs. 10.000 as the cost of erection and preliminary trials. No provision has been made for future developments. In order to allow for exigencies and additional equipment, as need may arise, it is safer to ask for a suppelimentary grant of Rs. 10,000.

Bark, chemicals, fuel etc. (Recurring expenditure.)

Bark	1,40,000	lbs.	Rs. 43,750
Slaked lime	15,000	"	
Sulphuric acid	9,000	"	
Caustic soda	6,000	"	
Decolourising carbon	500.	"	
Mineral oil	3,000	Gallons	" 3,250
Fuel	3,00,000	lbs.	" 2,500

The above list comprises only the major items. But we have to reckon also for a number of minor items too numerous to be listed in a preliminary note like this, and it is estimated that these will call for an additional grant of Rs. 5,000 a year.

Statement of financial implications.

Capital expenditure:

Buildings	Rs.	20,000
Plant and machinery	"	10,000
Total	"	30,000

Recurring expenditure:

Staff and labour	"	9,000
Bark	"	43,750

Chemicals and stores	Rs.	13,200
Fuel	"	2,500
Repair charges (Building and machinery)	"	3,000
Total	"	71,500

Value of products:

Quinine sulphate B.P?	4,000 lbs	Rs.	56,000
Cinchoa febrifuge	3,000 "	"	24,000
Total		"	80,000

In this estimate no account has been taken of interest charges on the capital investment, depreciation and insurrance. In preparing the balance sheet due allowance should be made for these factors.

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE,
MEDICAL DEPARTMENT. ~~Med 57 30-1~~

In replying please quote
No. C.417-1

OFFICE OF THE SENIOR SURGEON IN MYSORE,

Bangalore, dated the 12.8.1930

Med 13-30-2

Enc.

Telegrams:—
SENORGEN.

GENERAL MISCELLANEOUS BRANCH
1117
13 AUG. 1930

Telephone:—
No. 27

FROM

S. SUBBA RAO, ESQ., B.A., M.B.C.M., M.R.C.S., (Eng.) L.R.C.P., D.P.H.,
Senior Surgeon with the Government of His Highness the Maharaja of Mysore.

CHIEF SECRETARY
12 AUG. 1930

To

The Chief Secretary to the Government of His Highness
the Maharaja of Mysore, Bangalore.

SIR,

I have the honor to state that the question of the possibility of manufacturing as many of the medicinal drugs as possible locally has been engaging the attention of the Stores Purchase Committee, for some time. Practical endeavour in this direction is, however, circumscribed by considerations of our ability to turn out standard goods on an extensive scale and to successfully compete with the foreign manufacturing firms. Whatever the effort, it is doubtful if we could hope to attain a degree of excellence in the manufacture of, say, the several acids and the commoner salts, so as to displace the foreign products. Short of this, the concern would not pay and would quickly have to close down. The preparation of tinctures, extracts Etc., is a very much simpler matter and as soon as up-to-date buildings for the Medical Stores are provided, arrangements will be made for their preparation-atleast to the extent needed for departmental consumption.

The case is quite different as regards quinine. At present we are spending about Rs. 50,000/- annually- or very nearly one quarter of the entire allotment for the Stores -for the purchase of quinine and Cinchona Febrifuge. We ought to be able to save a considerable portion of this annually recurring expenditure if we made arrangements for the manufacture of quinine locally.

The ultimate aim is to make the arrangements self-contained,

self-contained, inclusive of the raising of a Cinchona Plantation suffieiently extensive for all requirements. This will, of course, take some years- probably ten or twelve - but in the meantime a beginning can be made with imported bark, the out-turn being limited to, say, 10-15 lbs., per day. I think this would be quite a practicable and economical scheme, even if we have to depend for some time entirely upon imported bark. I understand that in Madras the local produce of bark is even now supplemented by very considerable quantities imported from Java.

The following points require thotough investigation for formulating a scheme to start a Quinine Factory.

i. The procuring of reliable Cinchona Ledgeriaha seeds from Java.

ii. The possibility of growing this variety of Cinchona in suitable places in Mysore State.

iii. The possibility of importing from Java sufficient quantity of bark to manufacture 3,000 lbs., of quinine annually.

iv. The cost at which good Cinchona Bark can be obtained from Java, and the percentage of quinine contained in it.

v. The probable cost of the plant required to manufacture 10-15 lbs., of quinine per day.

vi. The probable working expenses in the manufacture.

I understand that Dr. Coleman is shortly to visit Java on deputation and I would request that he may be asked to study these questions on the occasion of his visit. I spoke to him and he has very kindly consented to render his assistance in the development of the scheme.

I have the honor to be,

S i r,

Your Most Obedient Serva

S. Subba Rao

SENIOR SURGEON, M

T.V.L.

Med. 13-30-3

G 2517/Encl 9 28.8.30

Dr. Leslie C. Coleman, M.A., Ph.D.,
Director of Agriculture in Mysore, Bangalore.

In forwarding herewith a copy of letter No. C. 417-1 dated the 12th August 1930 received from the Senior Surgeon in Mysore abou formulating a scheme for starting a Quinine Factory in Mysore, I am directed to state that Government will be glad if you will kindly investigate the several matters referred to therein during your forthcoming deputation to Java and send a detailed report to Government on your return.

I have the honor to be,

S i r ,

Your most obedient servant,

Chief Secretary to Government.

P.H.

Telegraphic Address "Agri., Bangalore."
Code-5th Edition A. B. C.

382

DEPARTMENT OF AGRICULTURE, MYSORE STATE.

22

In reply please quote in full the Nos. and indicative symbol given below.

BANGALORE, September 9, 1930

Roc. 512-Sc. 109/30-31.

Med 13-30-4

FROM

LESLIE C. COLEMAN, ESQ., M.A., PH.D.,
DIRECTOR OF AGRICULTURE IN MYSORE,
BANGALORE.

To

H. Madhava Rao, Esq.,B.A.,B.L.,
Chief Secretary to the Government of His Highness
the Maharaja of Mysore, Bangalore.

CHIEF SECRETARY 10 SEP 1930

SIR,

With reference to your letter No.G.2517/Med.13-30-3, dated 28-8-1930 about studying the question of Cinchona production with a view to manufacture quinine locally, I have the honour to state that I shall endeavour to carry out the instruction of Government in the matter.

I have the honour to be,
Sir,
Your most obedient servant,

Leslie C. Coleman

Director of Agriculture.

dsr

(6.53)

Telegraphic Address "Agri., Bangalore."
Code-5th Edition A. B. C.

DEPARTMENT OF AGRICULTURE,
MYSORE STATE.

(23

Med 13-30-5

In reply please quote in full the Nos. and indicative symbol given below.

BANGALORE,

...December...4,...19 30

Roc. 512-Sc. 109/30-31.

9 m 3483

FROM

LESLIE C. COLEMAN, ESQ., M.A., PH.D.,
DIRECTOR OF AGRICULTURE IN MYSORE,
BANGALORE.

To

N. Madhava Rao, Esq.,B.A.,B.L.,
Chief Secretary to the Government of Mysore,
Bangalore.

SIR,

With reference to your letter No.G.2517/Med.13-30-3, of the 28th August 1930, and subsequent reminder, I have the honour to state that I have delayed replying as I wished to submit a fairly complete note dealing with my observations in Java and accompanied by photographs. The note has been prepared, but it may take a further two or three days to prepare the photographs.

Many of the questions dealt with on the Senior Surgeon's questionnaire are dealt with on the report. Questions concerning the manufacture of quinine cannot be dealt with because the one quinine factory in Java at Bandoeng admits no visitors whatever. Further, questions as regards cost are viewed with distinct disfavour as can be imagined.

I felt I should exert all my energies towards the questions of getting a supply of seed for testing here and of ascertaining the possibility of getting a supply of bark.

1. As regards the former I have brought seed of a high-yielding strain of Cinchona Ledgeriana back with me and experimental work has commenced in connection with it.

2. I believe there are areas in Mysore more especially on the Bababudans and on the Kalasa area where tea is making a promising growth were Cinchona Ledgeriana may grow satisfactorily. This can be established only by experiment and the seed I have brought back should enable experiments to be started in this connection. It may be necessary to grow the Ledgeriana on Succirubra stock as is very commonly done in Java.

3. Re. possibility of importing bark from Java this can

be arranged, if at all, with the British group of growers through Messrs. Howards of London., I recommend in my note that the Mysore Trade Commissioner in London be instructed to approach Messrs. Howards on the matter.

4, 5 & 6. For reasons given above it was impossible for me to get information on these points. The whole sale of bark and manufacture of quinine is controlled by the Kina Bureau (with whom Howards have an agreement) in Amsterdam and the Secretary of the Java Delegation of the Kina Bureau informed plainly if -- courteously that information must come from the Bureau or from Messrs. Howards. Probably the Trade Commissioner may be able to get information on all these three points. As regards percentage of quinine, for grafted plants the bark of the roots will contain about 2% quinine that of stem about 8 or 9%. Average bark should therefore contain about 6% quinine.

As regards the suggestion of the Senior Surgeon that -- manufacture from local bark might start in 10 or 12 years I may point out that plantations in Java take 20 years to come to -- maturity. However thinnings commence from the 4th or 5th year. A small beginning could probably be made 5 years after a decent area of 100 or 200 acres are planted up. This would of course depend upon the success of Ledgeriana in Mysore, either from seed or grafted on to Succirubra stock.

I have the honour to be,
Sir,
Your most obedient servant,

Director of Agriculture.

Appendix F G—1

SUBJECT.....

.....

.....

Section Med

File No. 13-30

Serial No. 6

No. G. 6467/Gen 1

Diary No. of letter replied to.....3783 (653)

General and Revenue Secretariat

( )

the 193

To The Senior Surgeon on bor

Sel

Date of issue 19/12/30

With reference to your

Signed by Mr. G. V. V. C

letter no. C. 417-1 of 12.8.30 about

the question of manufacturing

quinine locally, I am directed t

forward herewith a copy of letter

no. A.O.C. 512-Te.109/30-21 of 4.12.

from Dr. L.C. Coleman in the matte

for your information. The note

referred to therein will be sent

to you as soon as it is rece

in this Office

List of enclosures.....

Copied by..... 17.12.30

Examined by.....

Yours

Lett

Cover

WD02559—GPB—25,000—25-6-30

16.12.30

Lieut Col Sel

(683A) med 13-30-7

Telegraphic Address : "Agri., Bangalore"
Code : 5th Edition A. B. C.

DEPARTMENT OF AGRICULTURE
MYSORE STATE

GENERAL 3994 17 DEC. BUS BRANCH

In reply please quote in full the Nos. and indicative symbol given below.

BANGALORE,

December 9, 1930

Roc. 512-Sc. 109/30-31.

FROM

LESLIE C. COLEMAN, ESQ., M.A., PH.D.,
DIRECTOR OF AGRICULTURE IN MYSORE,
BANGALORE.

To

N. Madhava Rao, Esq.,B.A.,B.L.,
Chief Secretary to the Government of Mysore,
Bangalore.

SIR,

With reference to your letter No.G.2517/Med.13-30-3, dated 28th August 1930, I have the honour to forward herewith my Report on Cinchona Cultivation in Java, together with a copy of letter No.2497-H.R. dated 24th October 1930 from Mr. M.A. van Roggen, Acting Head Manager of the Government Cinchona and Tea Estates, Tjinjiroean.

I have the honour to be,
Sir,
Your most obedient servant,

Director of Agriculture.

dsr(4)

To G.7646 21.1.31

The Director of Agriculture in Mysore.
Bangalore.

rec'd 13-30-8

Sir,

I am directed to acknowledge with thanks, the receipt of your Report on -- Cinchona Cultivation in Java together with its enclosures received with your letter -- No.R.O.C.512 Sc.109/30-31 dated 9th December 1930 and to express the appreciation of -- Government of the trouble taken by you in collecting such information as it was possible to obtain regarding Cinchona Cultivation in Java.

Govt. approve of your proposal to invite Dr. Kerbosch, Head Manager of the Government Tea and Cinchona Estates to -- Bangalore and they would glad if the Senior Surgeon, the Secretary, S.P.C. the Chief -- Conservator of Forests and yourself meet the gentleman and ascertain all particulars regarding the prospects of the supply of bark, purchase of quinine and any other matters on which his views would be useful.

With regard to the idea of manufacturing quinine locally from imported bark the first thing, of course, is to make sure that supplies of bark will be forthcoming. There is, however, no objection to your approaching the Howards in consultation with the Secy. S.P.C. as proposed by you and ascertaining definite information in the matter.

Government await with interest the results of the experiments which are said -

to --

be under way with the germination of the seed obtained from Java.

I have etc.,

Chief Secretary to Government.

Memo--No. G 8043-5/C/1 Copy of Report

Dated Bangalore, the 29th Jany. 1931.

Copy of the above, together with a copy of the Report is forwarded with compliments, to the (1) Senior Surgeon in Mysore. (2) The Chief Conservator of Forests in Mysore, (3) Secretary, Stores Purchase Committee, for - information.

By Order,

Chief Secretary to Government.

19.1.31

Report on Cinchona Cultivation in Java.

The cultivation of Cinchona in the Dutch East Indies furnishes one of the most striking examples of the value of science as applied to agriculture. Starting, as far as initial material is concerned on a level with British India, the Dutch have, through the application of science, forged ahead till they now produce approximately 90% of the quinine of the world.

The cultivation of cinchona was started by the Dutch East Indian Government in 1854 when the first seeds and plants were imported and set out on an area on the mountain plateau of Pengalengan (the Preanger highlands) south of Bandoeng. This site was chosen on account of the elevation (about 5000 feet) and the nature of the soil, which is a rich and friable loam well supplied with humus.

In 1872 a new species, Cinchona Ledgeriana whose bark has a much higher quinine content than the other cinchona species previously grown was introduced and from this time began the planting of cinchona by private enterprise. Almost from the first the Dutch East Indies Government has aided in the development of the industry from a planting side more especially through the selection of higher yielding types and through its work on the grafting of the more delicate Cinchona ledgeriana on to more vigourous stocks such as C. Succirubra. Private enterprise now furnishes about 90% of the quinine bark produced in Java only about 10% being produced on the Government cinchona plantation at Tjinjiroean near Pengalengan.

My investigations had to be confined to the agricultural side of cinchona ~~and quinine~~ production. Even had I been qualified to investigate the - - -

manufacturing side it would have been impossible for me to do so for I was informed that strangers were without exception refused entrance to the quinine factory in Bandoeng, the only one in Java.

The very short time at my disposal compelled me to restrict my study to a visit to the Government Cinchona plantation at Tjinjiroean (see map Fig.1) to which is attached the Cinchona Experiment Station. My main objects were to obtain seed of one of their best selections of Cinchona Ledgeriana and to -- ascertain whether it would be possible to obtain cinchona bark from Java for the manufacture of quinine in Mysore pending the establishment of -- plantations for the production of our nonbark. I naturally learned in addition as much as I could of the methods followed on both plantation and experiment station as time and circumstances would permit.

Unfortunately the Director of the station and plantation Dr. Kerbosch was absent on a trip to America and the plant breeder Dr. Spruit was also not present on the station at the time I visited it. I had, therefore, to gain what information I could from the acting Director of the Plantation Mr. M.A. van Roggen whose kindness and courtesy remain a very pleasant memory.

The plantation is one of the oldest in the world and comprises a planted area of approximately 900 hectares (= 2025 acres). It has been in existence for the past 80 years. The plantation is run as a commercial concern by Government while the Experiment Station is controlled by the Algemeen Landbouw - Syndicate with which the Government is associated. The plantation management is a part of the -----

Vereeniging van Kinabastprodzenten (Union of Cinchona Bark Producers) an organization which embraces all the Cinchona plantations in Java. 3 This organization of cinchona planters is closely associated with the quinine manufacturers in Java and Holland, the whole forming the socalled Kina Bureau. The Kina Bureau fixes the production of bark and quinine every year. It ~~also~~ apportions the amount of bark each estate will produce and the amount of quinine and other products each -- factory will manufacture. It also fixes the price of bark, quinine and other cinchona products. The Government plantation produces about 10% of the cinchona bark produced in Java and I was informed is at present working at just half capacity. Mr. van Roggen's assurance that the Kina Bureau is an organization filled with a desire to alleviate the ills of humanity to the greatest extent possible had to be accepted with considerable reserve. This ~~was~~ is more especially the case from the fact that when I asked him a perfectly obvious question why the whole of the manufacture was not done in Java instead of sending two-thirds of the bark to Europe for manufacture there - he explained that the vested interests in Holland had to receive consideration.

As already stated plantation and experiment station are situated on the Preanger highlands at an elevation of approximately ~~5000~~ 5500 - 6500 feet. The rainfall in this district averages about 150 - inches per annum and is very well distributed as is indicated by the rainfall map attached (Fig.2). The soil is a very fertile and friable loam, volcanic in origin. It is decidedly retentive of moisture as evidenced by the fact that, though the

district had passed through an exceptionally dry period, the soil was still quite moist within six inches of the surface. The surrounding area is given up entirely to the cultivation of cinchona on the higher elevations with tea lower down at between 4000 and 5000 feet. The Preanger tea district is the finest in Java and one of the finest in the world.

The plantation consists almost entirely of Cinchona Ledgeriana for the most part grafted on to C. Succirubra stock. There are about 70 hectares (about 160 acres) of C. Succirubra. Where possible C. Ledgeriana is grown from seed but this is only -- feasible on soils which have not previously carried a cinchona crop. As most of the area has had -- cinchona on it two or three times, Ledgeriana will not grow well and has therefore to be grafted on to the much more vigourous Succirubra stock. This enables the growers to use material from their best selections of Ledgeriana. Nevertheless the use of -- Ledgeriana seedlings is more profitable whereever they will grow well as the trees are harvested roots and all and the roots contain from 1/4 to 1/3 of the quinine in the whole tree. As Succirubra yields only about 2% of quinine while the best selections of Ledgeriana yield nearly 9% the desirability of growing Ledgeriana on its own root system is obvious.

The main plantations of Ledgeriana are planted out about a metre each way and are then thinned to two metres (about 6½ feet) each way at the end of 4 or 5 years. The plantations reach their highest economic productivity at from 20 to 25 years. After this the increases in yield per tree are not proportional to the age. They are, therefore -- harvested entire, the roots being dug out. After harvest the land is planted with Acacia decurrens

which is left for 5 years when it is removed and a fresh cinchona plantation started. Fig.3 shows part of a field of C. Ledgeriana on a slope about ready for harvest.

After removal and partial drying the bark is beaten off with wooden mallets even the fine roots being subjected to this treatment (see Fig.4). It is dried in the sun on special platforms which have a movable roof which can be dropped over them during a rain (see Fig.5). From here it goes to a Sirocco drier. It is then ground into a fairly fine powder and sacked in rectanguler sacks or bales about 4 feet by 1 foot by 1 foot. The bark powder is shaken down and the bale is shaped with a wooden mallet and then sewed up. The best packing is done for bark which has to be sent to Holland, the short journey to the Bandoeng factory calling for much less care in this regard. The plantings of Succirubra which are dealt with in much the same way both as to treatment in the field and harvesting yield a bark which is all sent to Holland for the production of other medicinal products, such as quinine, wine, The Succirubra bark is packed and shipped in tea chests. Fig.6 shows a row of Succirubra tree in front of a Ledgeriana plantation.

Returning to the starting of the plantation, the seed is carefully collected and sorted. The sorting is done in a dark room on boxes containing an electric light and with a cover of ground glass. The seeds are spread out on the illuminated ground glass and the plump healthy seeds are selected out with a feather. A special gang of trained women are used for this purpose. This seed is tested for germinating capacity in special germination dishes on filter paper which is kept at approximately constant

moisture. If there has not been a germination of 90% within 19 days the seed is discarded. Seed, if properly dried and kept, will remain viable for three years. I saw some germinating satisfactorily which had been kept two years.

The seed beds for germination on a large scale are prepared with fresh soil each time. They use jungle soil collected from special trees but Mr. van Roggen does not believe there is any special virtue in this. The soil is not sterilized before using. The seed beds are specially shaded with mats which can be raised and lowered (see Fig.7). They have been experimenting with different devices for shading and I saw one such which was much more elaborate. Mr. van Roggen expressed the view that they had not yet found any thing better than the simple form illustrated.

The nurseries which I saw (Fig.8) were of Succirubra stock on to which Ledgeriana had been grafted. The Succirubra seedlings are planted out the previous year. Ledgeriana material for grafting is taken from branches or branch portions of over a year's growth which have just hardened or lost their green colour. The grafting is usually done on the nursery beds but some basket plants had been specially prepared to show me the method followed. This is illustrated in Fig.9. It is a rather crude method of side grafting. Branches of about two nodes and just over a year's growth after being properly tapered to a wedge shape are inserted into a slit made in the side of the stock. The whole is tied with plantain fibre and then covered with grafting wax. The leaves of the Succirubra stock are left until the appearance of the first leaves on the scion

when the stock is topped. The whole stock is cut back to the point of insertion of the scion only after a good growth of the latter has started. Mr. van Roggen informed me that a man with a women -- helper could graft from 300 to 500 plants in a day. Each labourer is paid about 35 cents (between 5 & 6 annas) per day. The cost for grafting plants enough for an acre (3000) is about 12 guilders, (about 13 rupees). He said they obtained about 90% of successes in grafting but in the nursery beds I examined there could not have been more than 70% of success.

The whole production is kept under chemical control. Small samples of the harvested bark are, when thoroughly dried, ground in a mortar and extracted with benzene 7 hours at 70° C., neutralized with H.Cl. and crystallised as quinine tartrate. The well equipped chemical laboratory on the plantation makes analyses not only for the plantation itself but for all estates in the combine. I may say that Mr. van Roggen did not consider the chemical control satisfactory but possibly he (being a planter) may have retained some of the contempt of the practical man for the scientist.

Dr. Spruit who is in charge of selection work at Tjinjiroean was unfortunately not on the station so I had not the privilege of being shown over the experiment station plots by him. However Mr. Van Roggen was a very painstaking guide. The work that I saw was concerned exclusively with the testing out of selections of C. Ledgeriana . Although Dr. Spruit is also concerned with the investigation of insect pests and fungus diseases I saw -- practically nothing of this side of the work. I

may say that the test plots and plantations in general had a very healthy appearance and I saw no evidence of any serious disease. There are a number of insect pests including the Atlas moth and an insect similar to or identical with the mosquito blight of tea. Of fungus diseases a bark canker is the most serious.

Turning to the breeding work the C. Ledgeriana selections suitable for grafting on to Succirubra stock are, after grafting, planted out in test plots containing from 2 to 4 rows at spaces of 1 metre to 1¼ metre apart. The selections are in the first instance made on the basis of vigour as it is not possible to tell before the age of 4 or 5 years what the quinine content is likely to be. It was earlier thought that there would be correlations between certain morphological characters and quinine content. Thus it was supposed that large leaved selections would have low quinine content and vice versa. This was on the analogy of C. Succirubra which is large leaved and has a low quinine content. Similarly there was thought to be a correlation between colour of leaf and quinine content, the red leafed varieties having the higher content. Both these suppositions have proved false and no correlation whatever seems to exist between size or colour of leaf and the quinine content of the bark.

In the testing gardens alternate rows and plants in the row are thinned after 4 or 5 years. In the preliminary test no attempt is made at an accurate comparison by means of control plots but in a second series of plots each new clone (selection for grafting) is alternated with a standard variety (W3) which has upto the present proved the best selection obtained. This second generation

test is looked upon as quite necessary as differences in growth observable in the first generation plots may be due to inequalities of the soil Figs. 10, 11, 12 & 13 give views in the selection plots.

The actual testing for quinine content is done at the age of 4 or 5 years. This is done on the basis of (a) percentage quinine in bark estimated in strip of bark about 10 cms. wide around the stem at from 3 or 4 feet height (b) the thickness of the bark and (c) the ~~xxxxxxxxxx~~ circumference of the tree.

In taking up the question of supply of seed and bark with Mr. van Roggen I had naturally to be as tactful as possible. He expressed a view quite natural for a Dutchman that they had reached such an advanced stage in the production of quinine that there was not much use in any other country attempting to compete. As regards supply of seed or any living material he informed me that this could be done only with the approval of the executive committee of the Vereeniging van Kinabast Produzenten. He thought there was a chance of getting a small quantity of seed if a written requisition was sent up. I visited Tjinjiroean on the 30th September and 1st October. On the afternoon of the 1st October I sent Mr. van Roggen a requisition for seed. I received a reply just before I sailed stating he had received permission to let me have some. I then got into touch with him over the phone and managed to get a small supply of two grammes of one of their best selection of C. Ledgeriana seed sent to the boat so that I was able to bring it along with me. This seed is certified to have a germinating capacity of 98%. The sample contains from 5000 to 6000 seed so that a fairly large scale experiment on

is one that has required the display of considerable tact and I consider we may congratulate ourselves on obtaining material where others apparently have failed.

****

C. Ledgeriana can be carried out. Experiments on the germination of this seed are, with the approval of the Chief Conservator of Forests, at present under way in the Botanical Laboratory of the Department where special facilities for seed germination exist.

To my surprise I found the question of bark supply a more difficult one. Mr. van Roggen informed me that bark supply is entirely under the control of the Kina Bureau and that I should have to write to the Secretary of the Indian Delegation of the Kina Bureau in Batavia to get information on the subject. I wrote at once to the Secretary Mr. Stolz to arrange an interview and received a reply stating that while he would be glad to see me he could give me no information, as the supply of bark was controlled entirely by Kina Bureau in Amsterdam.

On the morning of the 29th October I had an interview with Mr. Stolz and with the President of the Nederlands Handels Mattschappij, Batavia on this question. They informed me that through an agreement between the Kina Bureau and Messrs. Howards of London the supply of bark from British owned cinchona estates in Java is controlled by the latter firm. They thought that possibly a supply might be arranged for through Howards but that they personally could do nothing in the matter. I suggested to them that probably the best arrangement would be to have the Mysore Trade Commissioner in London discuss the matter on the spot with Howards and they agreed. I would suggest that the Trade Commissioner be instructed to take up the matter.

Prior to my departure from Java I received a letter from Mr. van Roggen in connection with the supply of quinine. From this letter it will be seen

that the Kina Bureau, apparently somewhat anxious at the attempts that are being made to break their monopoly and sensitive to the criticism that has been levelled against them, are proposing a reduction in the cost of quinine. As will be seen Mr. van Roggen also states that Dr. Kerbosch is expected on his way back to Java to visit Madras presumably in connection with the question of quinine supply. As soon as I learnt this I wrote to Mr. van Roggen asking him to let me know how to get into touch with Dr. Kerbosch and in addition to write to Dr. Kerbosch inviting him on our behalf to visit Bangalore. I have as yet had no reply from Mr. van Roggen and propose with Government's approval to write to the Dutch Consul Madras in the matter. He will probably have been informed of Dr. Kerbosch's proposed movements..

In conclusion I must place on record my appreciation of the kindness and courtesy of Mr. van Roggen and of the representatives of the Kina Bureau. I believe if the experiments with the growth of Cinchona Ledgeriana prove at all successful it may be possible for me to get more seed for an extension of plantations.

I have at the same time brought back with me all the publications of the Cinchona Station that were available. Unfortunately these are all published in the Dutch language but if the cultivation of Cinchona is to be taken up seriously in Mysore it will, I believe, be quite essential to keep in touch with the work that is being done in Java. While I can read Dutch with a fair degree of ease I shall not have the time to translate articles. Translations can, however, be obtained in Bangalore if it is -- considered necessary.

I need hardly point out that the investigation

D.O.No.2497/H/R. dated 14th October 1930 from the Acting Headmanager of the Government Cinchona and Tea Estates, - - Tjinjiroean, to the Director of Agriculture in Mysore, Bangalore.

After your visit to our estate I asked and obtained the necessary informations concerning the supply of quinine c.q. cinchona bark to the Government of Mysore.

The providing of the latter would be a rather difficult matter I fear, which I gather your Government would have to take up directly with the Kina-Bureau at Amsterdam.

Whether it would be advisable for your Government from a financial point of view, to import cinchona bark and manufacture her own quinine, I take the liberty to be sceptical about. As a matter of fact up till now there has been a yearly export of small quantities of cinchona bark produced by some of the British cinchona plantations on Java to increase the output of quinine of the two Government quinine factories in British India. Notwithstanding that their cost of manufacture and distribution seems to be still very high.

I just now got an order to hand issued by the Government of Madras, dated 24th of June last, stating that for purpose of encouragement the distribution price of quinine " should be reduced to as low a figure as practicable". Accordingly this price has thereby been fixed at five annas per ' treatment' of 20 tablets of 4 grains of quinine each, packed in (rather bad!) cardboard tubes. I am in a position to inform you that just now the Kina-Bureau is considering to supply an additional amount of quinine either to the Government of British India or to some big private dealers, and, if wanted, to Mysore State too of course.

This quinine would be made in the form of tablets too, but packed much more neatly and efficiently in glass tubes, and sold at a price very considerably lower than the aforesaid price of Madras-quinine.

The headmanager of this estate, Dr. Kerbosch, now visiting Holland and the U.S.A., will probably on his way back to Java make a short visit to Madras to discuss this matter with the officials there.

In case the Government of Mysore would be willing, - quite apart from their own experimental cultivation of -- Cinchona - to bring this cheap and attractive form of quinine within easy reach of the population, specially the poorer classes, I would advise you to direct the officials in charge of this matter to the manager of the "Bandoengsche Kinine-fabriek" Bandoeng.

As regards the supply of seed of C. Ledgeriana to your Government I believe there will not be many difficulties now, provided you require only a small quantity.

When you will kindly let me know how much is wanted (the price of this seed is fl. 10.- per gram) I would -- possibly be able to forward it eventually to you in Buitenzorg so that you could take it home under your own care.

******

"C.O.P Y."

Director of Agriculture.

G. 1223 & 8.8.31

R. Ranga Rao, Esq., B.A., B.L.,

The Director of Agriculture in Mysore

Bangalore.

In inviting reference to your Office letter No.R.O.C. 2617/Sc.381 of 30-31 dated 2nd April 1931 about the supply of chinchona bark and purchase of quinine, etc., I am directed to enquire if there is any likelihood of Dr. Kerbasch visiting Mysore early.

The favour of a reply is requested.

I have the honour to be,

Sir,

Your most obedient servant,

Draft.

For General Secretary to Government.

Agr/2.

44

Telegraphic Address : " Agri., Bangalore"
Code : 5th Edition A. B. C.

DEPARTMENT OF AGRICULTURE

MYSORE STATE.

BANGALORE,

13th August, 1931.

In reply please quote in full the Nos. and indicative symbol given below.
Roc. 433 Sc. 63 of 31-32.

FROM

LESLIE C. COLEMAN, ESQ., M.A., PH.D., C.I.E.,
DIRECTOR OF AGRICULTURE IN MYSORE,
BANGALORE.

GENERAL SECRETARY'S 14 AUG. 1931 No. 1024

GENERAL 1002 14 AUG. 1931

To

R. Ranga Rao, Esq., B.A., B.L.,
General Secretary to the Government of
His Highness the Maharaja of Mysore,
General and Revenue Secretariat, Bangalore.

SIR,

med. 13-30-9.

With reference to your letter No.G.1223/med.13-30 dated 8th August 1931, I have the honour to state that I learn Dr. Kerbasch was unable to visit India on his way back to Java. It is, therefore, unlikely that he will be able to visit Mysore for another two or three years, when he might do so on his way to Europe on leave.

I have the honour to be,
Sir,
Your most obedient servant,

Director of Agriculture.

A/J.

13/8/31